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Li Shaofan

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BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER

LABUD, JONATHAN R

ART UNIT

PAPER NUMBER

2192

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/560,257	Applicant(s) SHAOFAN, LI	
	Examiner JONATHAN R. LABUD	Art Unit 2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,11,12 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,11,12 and 21-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is responsive to Applicant's amendment for application 10/560,257 dated January 20, 2010, responding to the October 13, 2009 Office Action provided in the rejection of claims 1, 3, 11-12 and 21-25, wherein claims 1, 11 and 23 have been amended, and claims 2, 4-10 and 13-20 were previously cancelled in the amendment dated June 15, 2009.

Claims 1, 3, 11-12 and 21-25 remain pending in the application and have been fully considered by the examiner.

Remarks

2. Applicant's primary argument is directed to:

(A) Claim 1 is patentable over the IBM and Mann references because neither discloses storing branch address information in a memory that is independent of a VMM, in contrast to storing the recorded branch addresses in a memory buffer included in the VMM (see applicant's remarks, page 6 paragraphs 2-3), claims 11 and 23 are patentable for similar reasons to those given with respect to claim 1, and claims 3, 12, 21, 22, 24 and 25 are patentable as depending from the independent claims 1, 11 and 23.

3. Argument (A) is not persuasive and will be addressed under the Prior Art's Arguments - Rejections section at item 5 below. The rejections over the prior art disclosed in the previous office action is maintained. In addition, any new ground(s) of rejection presented in this Office

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Action were necessitated by the Applicant's amendment. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Examiner Notes

4. Examiner cites particular paragraphs or columns and lines in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Prior Art's Arguments – Rejections

5. Applicant's argument (A) (see item 2 above) filed January 20, 2010 has been fully considered but is not persuasive.

Regarding (A), the examiner respectfully disagrees with this argument. The system disclosed by IBM (see for example, Page 1 lines [30-31 and 39-40], Page 2 lines [12-15 and 25-30]) utilizes a tester which acts as a passive monitor of a VM system (i.e. virtual machine monitor operatively coupled to a virtual machine monitor), wherein "A control store address trace provides a means of recording the actual execution path of the microcode for problem resolution. The control store address trace function stores in its data memory" (i.e. the control store address trace acts as an information collection module which stores recorded branch address information in memory). Furthermore, "Control store address traces are useful for debug activity. When a problem is encountered during test, the test unit" (i.e. the tester which is the virtual machine monitor) "is usually attached to its host processor for coverage measurements. The problem-definition people can make immediate use of the test unit by invoking the trace menu screens" (i.e. the control store address trace is part of the tester, which means that the memory of the control store address trace is also in the tester). Therefore, this argument is unpersuasive.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3, 11-12 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin (Software Path Coverage Measurements) (Hereinafter IBM) in view of Mann, Daniel P. (U.S. 6,094,729) (Hereinafter Mann).

As per claim 1, IBM discloses a method comprising:

executing a target program via a central processing unit (CPU), the target program to include a plurality of branches and to be executed via a virtual machine, the virtual machine operatively coupled to a virtual machine monitor (see for example, page 1 lines [24-30 and 39-40] and page 2 lines [27-28], this limitation is disclosed such that a program with branches is executed in a VM system which has a host processor, wherein a tester (i.e. virtual machine monitor) acts as a passive monitor of the VM system);

an information collection module (ICM) included in the virtual machine monitor, the ICM to collect code coverage information about the target program (see for example, page 2 lines [12-15], this limitation is disclosed such that a control store address trace (i.e. an ICM) which is part of a test unit (i.e. virtual machine monitor) collects code coverage information about the software being tested);

recording a branch address when the ICM is notified one of the plurality of branches is taken (see for example, page 1 lines [26-30] and page 2 lines [12-17], this limitation is disclosed such that a signal indicates a need to record a memory address which has just changed, i.e. “a branch was taken”);

storing the recorded branch addresses in a memory buffer included in the virtual machine monitor (see for example, page 2 lines [12-17], this limitation is disclosed such that the memory address execution path (branch addresses) is stored in the control store address trace (ICM) memory which is part of the testing unit (VMM) (i.e. the memory is part of the control store address trace and the control store address trace is part of the testing unit, which means the memory is included in the testing unit via the control store address trace); and

determining code coverage of the target program based on the branch addresses stored in memory (see for example, page 2 lines [25-28], this limitation is disclosed such that addresses stored in memory are used for code coverage measurement of the program being tested).

Although IBM discloses path coverage to include when “a branch was taken” (see above), it does not explicitly teach configuring the CPU to notify an information collection module (ICM) via an interrupt when a branch occurs (i.e. specified condition).

However, Mann discloses configuring the CPU to notify an information collection module (ICM) via an interrupt (see for example, Figures 1-2 and associated text, this limitation is disclosed such that trace control circuitry 218 interfaces with CPU 104 to configure it for software execution tracing. CPU debug port 100 supplies commands (interrupts) to start capture of software execution trace records in trace buffer 200 (information collection module)) when a branch occurs (see for example, column 2 line [65] - column 3 line [9], this limitation is disclosed such that notification occurs when the CPU signals the occurrence of a specified condition (i.e. branch taken emphasis added)l.

IBM and Mann are analogous art because they are from the same field of endeavor, software testing.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method as taught by IBM by configuring a CPU as taught by Mann because it would provide an effective means of selectively activating and deactivating trace functionality (see for example, Mann column 6 lines [17-24]).

As per claim 3, IBM discloses providing the recorded branch addresses to a coverage pattern generation module (CPGM) to interpret and display code coverage statistics (see for example, page 2 lines [26-35], this limitation is disclosed such that a test unit (coverage pattern generation module) uses recorded address traces (branch addresses) to debug and display code coverage measurements (statistics)).

Regarding claim 11, it is an article of manufacture claim having similar limitations cited in method claim 1. Moreover, all actions of the method disclosed in the rejection to claim 1 are performed by a means (see for example, IBM page 1 lines [21-24]). Thus, claim 11 is also rejected under the same rationales as cited in the rejection of claim 1.

Regarding claim 12, it is an article of manufacture claim having similar limitations cited in claim 3. Thus, claim 12 is also rejected under the same rationales as cited in the rejection of claim 3.

As per claim 21, IBM discloses the limitation wherein the CPGM comprises a graphical user interface (GUI) to accept a source file of the target program and the recorded coverage statistics (see for example, page 2 lines [28-35], this limitation is disclosed such that the tester unit (CPGM) can allow users to interact with displayed menus (GUI) in order to utilize the program code and trace data file).

Regarding claim 22, it is a method claim having similar limitations cited in claim 21. Thus, claim 22 is also rejected under the same rationales as cited in the rejection of claim 21.

Regarding claim 23, it is a system claim having similar limitations cited in method claim 1. Moreover, all actions of the method disclosed in the rejection to claim 1 are performed by a system (see for example, IBM page 1 lines [39-40]). Thus, claim 23 is also rejected under the same rationales as cited in the rejection of claim 1.

Regarding claim 24, it is a system claim having similar limitations cited in claim 3. Thus, claim 24 is also rejected under the same rationales as cited in the rejection of claim 3.

Regarding claim 25, it is a system claim having similar limitations cited in claim 21. Thus, claim 25 is also rejected under the same rationales as cited in the rejection of claim 21.

Response to Arguments

8. Applicant's arguments with respect to prior art rejections of claims 1, 3, 11-12 and 21-25 have been fully considered but they are not persuasive as addressed under the Prior Art's Arguments - Rejections section at item 5 above.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Labud whose telephone number is 571-270-5174. The examiner can normally be reached on Monday to Friday 6:30 AM to 4:00 PM. If attempts to

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reach the above noted Examiner by telephone are unsuccessful, the Examiner's supervisor, Tuan Dam, can be reached at the following telephone number: (571) 272-3695.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 12, 2010
/J. R. L./
Jonathan Labud
Examiner Art Unit 2192

/Tuan Q. Dam/
Supervisory Patent Examiner, Art Unit 2192